

Research Portfolio

1. Ongoing PhD Projects
2. Past Research Projects
3. Industry UXR Projects

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1. Ongoing PhD Projects

- Building an AI Discussion Facilitator Tool for Wikipedia
- Building Design Guidelines for AI Companions



Building an AI Discussion Facilitator Tool for Wikipedia

Background & Problem



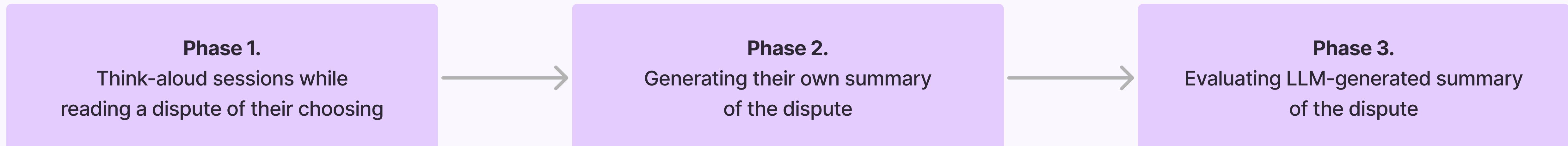
- Countless discussions take place on Wikipedia, and they naturally include disagreements.
- The problem is that experienced editors often dominate disagreements by posting lengthy, prompt responses to exhaust their counterparts and discourage third parties from joining the conversation.
- It's unrealistic to have a facilitator who constantly reads every comment as they're posted while also being familiar with Wikipedia's unique culture and rules.

⇒ My solution is to use AI for this task.

Step 1. Investigating Wikipedians' Discourse Comprehension and Perspectives on AI Facilitation Tool

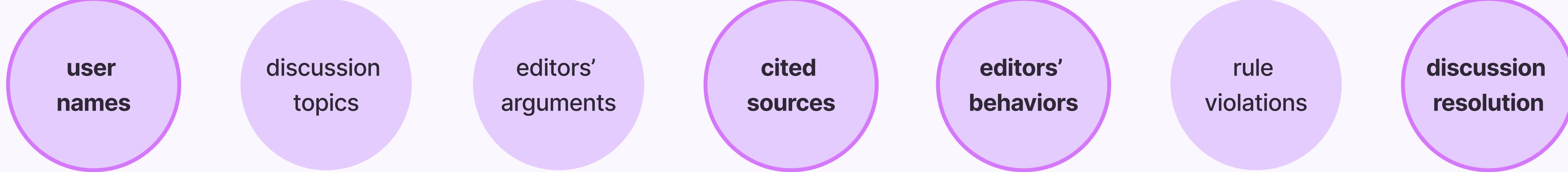
Method: Interview

1. Prepared **actual disputes** from Wikipedia along with **LLM-generated summaries** to present to participants during interviews.
 - a. Four disputes were selected from 24 candidate discussions, and summaries were generated by ChatGPT using an LLM prompt that was refined over five iterations with the 24 discussions.
2. Conducted **three-phase interviews** with 14 Wikipedians.



Result

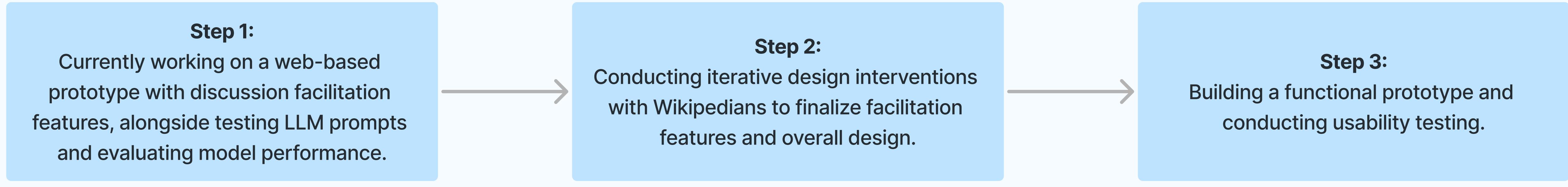
The results of each phase consistently reaffirmed the key discussion elements that Wikipedians need and expect from discussion summaries, which are:



Evaluations of the LLM-generated summaries revealed that the highlighted elements, which are community-related, were less satisfactorily depicted in the summaries.

Step 2. Building AI Discussion Facilitator Tool

Method

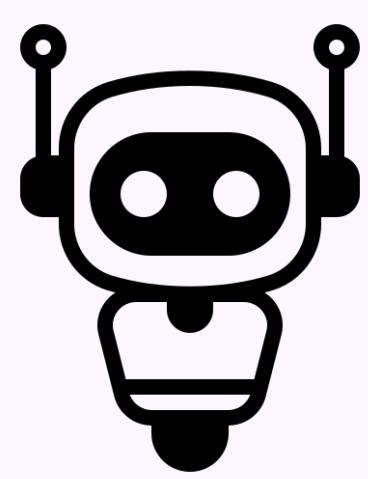


Step 3: Implementing the tool within Wikipedia

Method: Field Study

Building Design Guidelines for AI Companions

Background & Problem



- AI companions are chatbots designed to offer meaningful interaction, connection, and emotional support.
- They provide highly emotional and relational user experiences, requiring sensitive and thoughtful design. However, discussions about their ideal form are still limited.
- Additionally, limited research on designing AI companions makes it hard to rely on general principles of human-computer interaction, as these principles can fail to capture the unique user experiences of AI companions.

⇒ My goal is to create design guidelines specifically tailored to AI companions.

Step 1. Capturing User Experiences

Step 1.1

Collaborative Autoethnography

Four researchers each interacted with two AI companions over a 10-day period. This resulted in approximately 26.67 hours of conversation and 13.33 hours of reflexive note-taking.

Step 1.2

Translating Experience into Guidelines

The collaborative autoethnography yielded 27 positive and 36 negative themes. Positive themes informed a "to-do" list, while negative themes shaped a "not-to-do" list, resulting in 18 design guidelines.

Step 1.3

Modified Heuristic Evaluation

A modified heuristic evaluation with 11 participants assessed the clarity, applicability, and importance of the design guidelines. Feedback from the evaluation was used to refine and finalize the guidelines.

Step 2. Synthesizing Collective Knowledge

Step 2.1

Finding Documents

Collected design guidelines and principles from HCI, HAX, HAI, and companion-related domains (robots, AI). After initial filtering, 41 documents with 548 guidelines were selected.

Step 2.2

Second Filtering

Assigned all 548 guidelines to 5–6 students for coding as "yes," "no," or "maybe" regarding their applicability to AI companion design. Through coding and discussion, 449 guidelines were retained.

Step 2.3

Synthesizing Filtered Guidelines

Currently synthesizing the 449 guidelines into a set of literature-based design guidelines. These will be combined and resynthesized with user-experience-based design guidelines from Step 1.

After completing Steps 1 and 2, which encompass both user experience and literature review, the initial set of design guidelines will be created.

Step 3. Heuristic Evaluation

Step 3.1

Internal Heuristic Evaluation

Conduct a heuristic evaluation of the initial set of guidelines within the research team for refinement.

Step 3.2

External Heuristic Evaluation

Conduct a final heuristic evaluation with external professionals to finalize the set of guidelines.

2. Past Research Projects

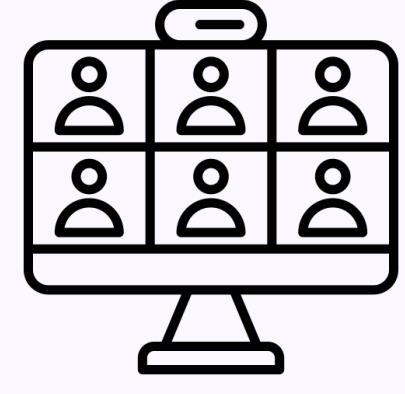
- Exploring and Designing Solutions for Virtual Co-Studying
- Designing a Knowledge-Sharing Chatbot for a Co-Living Space



SEOUL NATIONAL UNIVERSITY

Exploring and Designing Solutions for Virtual Co-Studying

Virtual Study Rooms



Video conference rooms where people join to study in a **library-like studying environment** at home. In virtual study rooms, videos are used to **share the ambient presence** of a hard-studying individual while **audio is often disabled** to minimize any distractions.

Step 1. Identifying the needs and coping mechanisms of virtual co-studying users*

Step 1.1

Identifying key user needs

Method

Conducted **interviews with 31 virtual co-studying users** on the perceived advantages and limitations of virtual study rooms.

Result

Found three advantages and six limitations, which were organized into **seven key user needs**. These needs reflected both "revealing" and "hiding" preferences, suggesting a **conflict between users' desires to share and to conceal**.

Revealing Needs

- Strong Presence
- Strong (Self-)Surveillance
- High Surveillance Capacity
- Stimulation of Competitive Spirit

Hiding Needs

- Low Self-Awareness
- Low Distraction
- Protected Privacy

Step 1.2

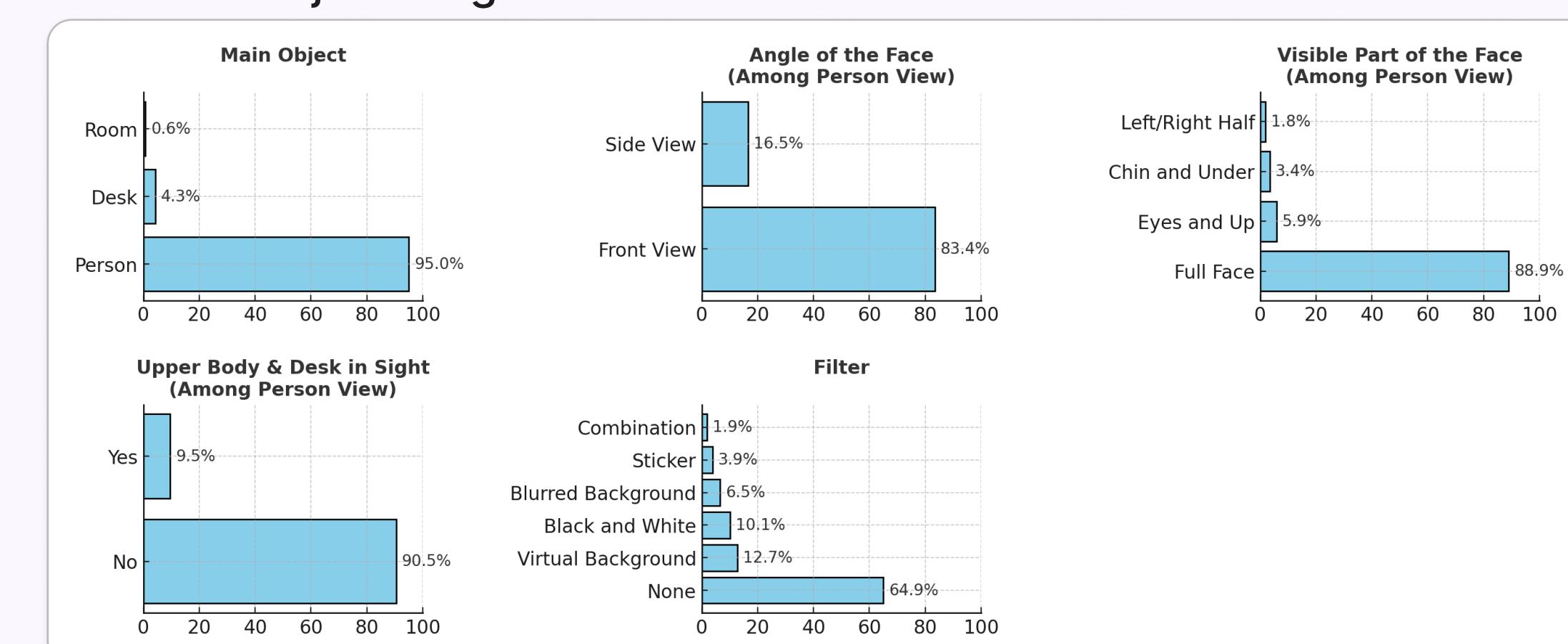
Identifying video features that reflect users' coping mechanisms

Method

Analyzed **464 video screens** captured from actual virtual study rooms.

Result

Identified five major categories of video features.



Step 2. Designing an interface to address conflicting needs**

Step 2.1

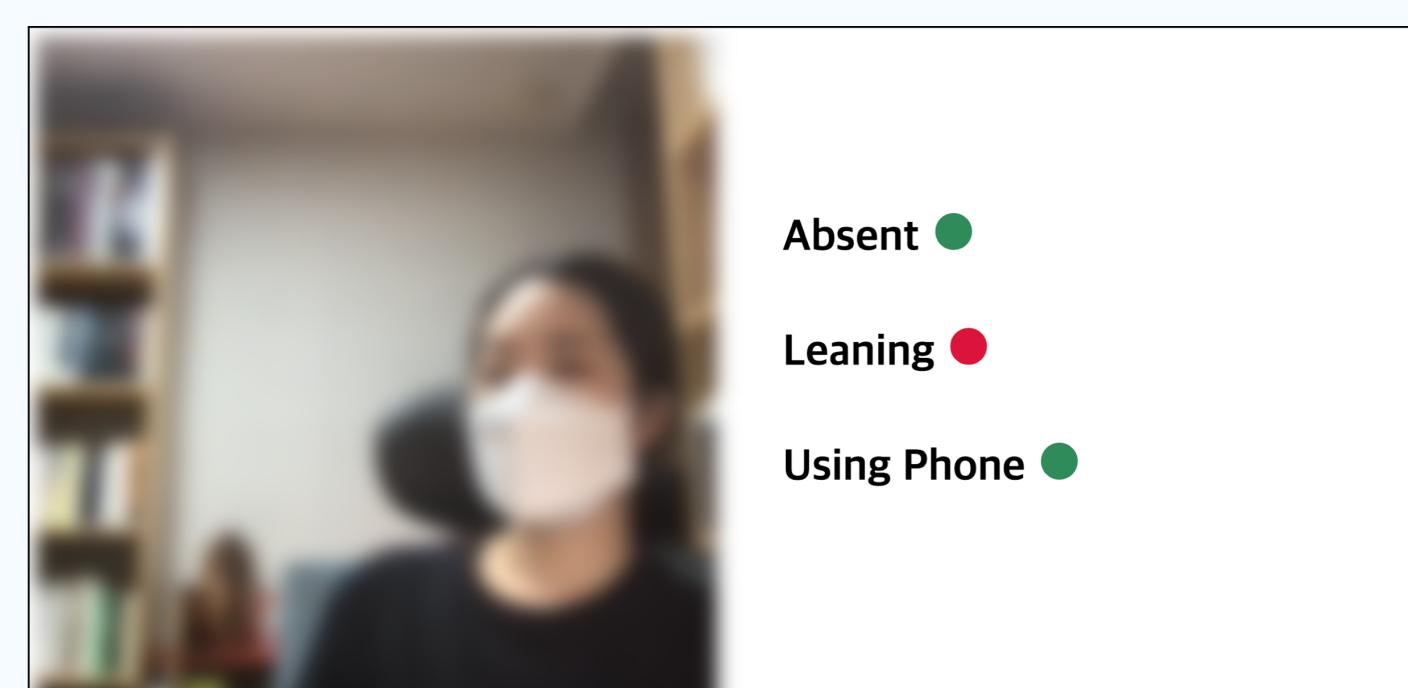
Designing interface prototypes

Method

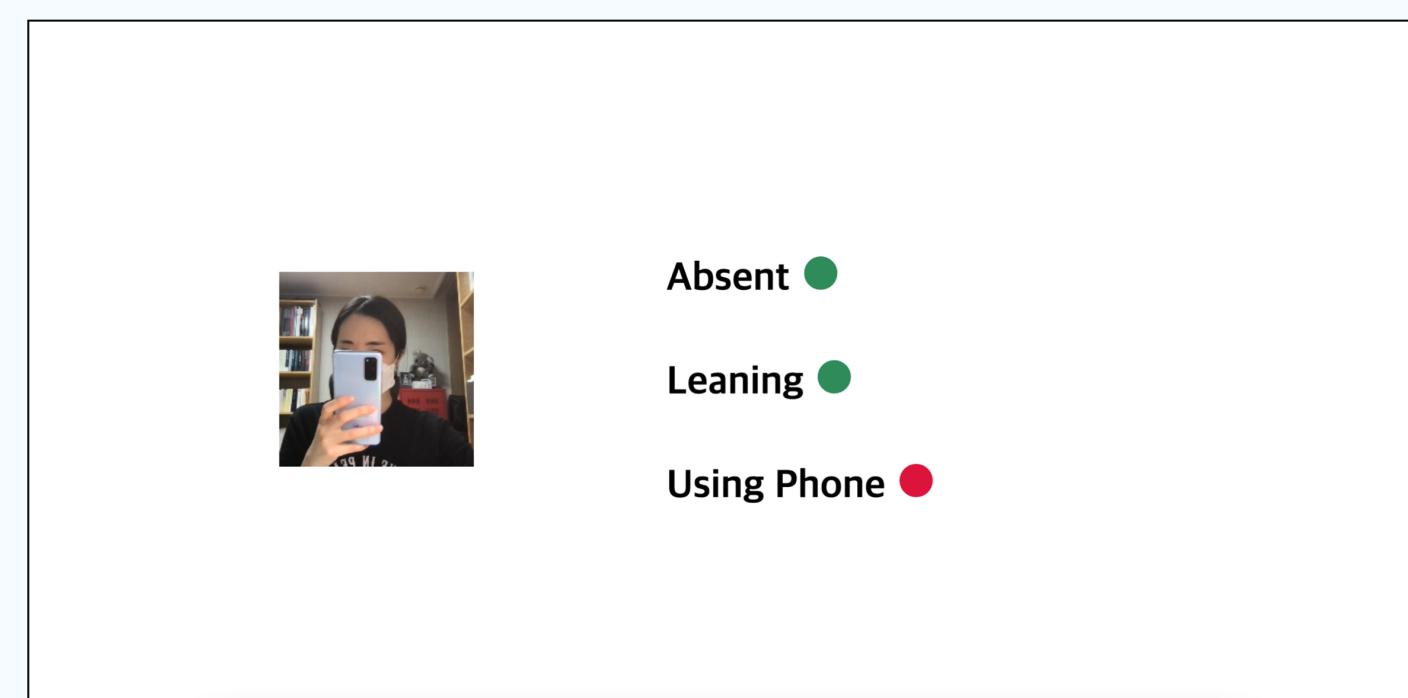
Created three versions of **interface prototypes** to reduce video explicitness: blurred video, small video, and no video. All versions **detected key activities for monitoring** (absence, leaning, phone use) through an activity recognizer trained with over 2,000 images.

Result

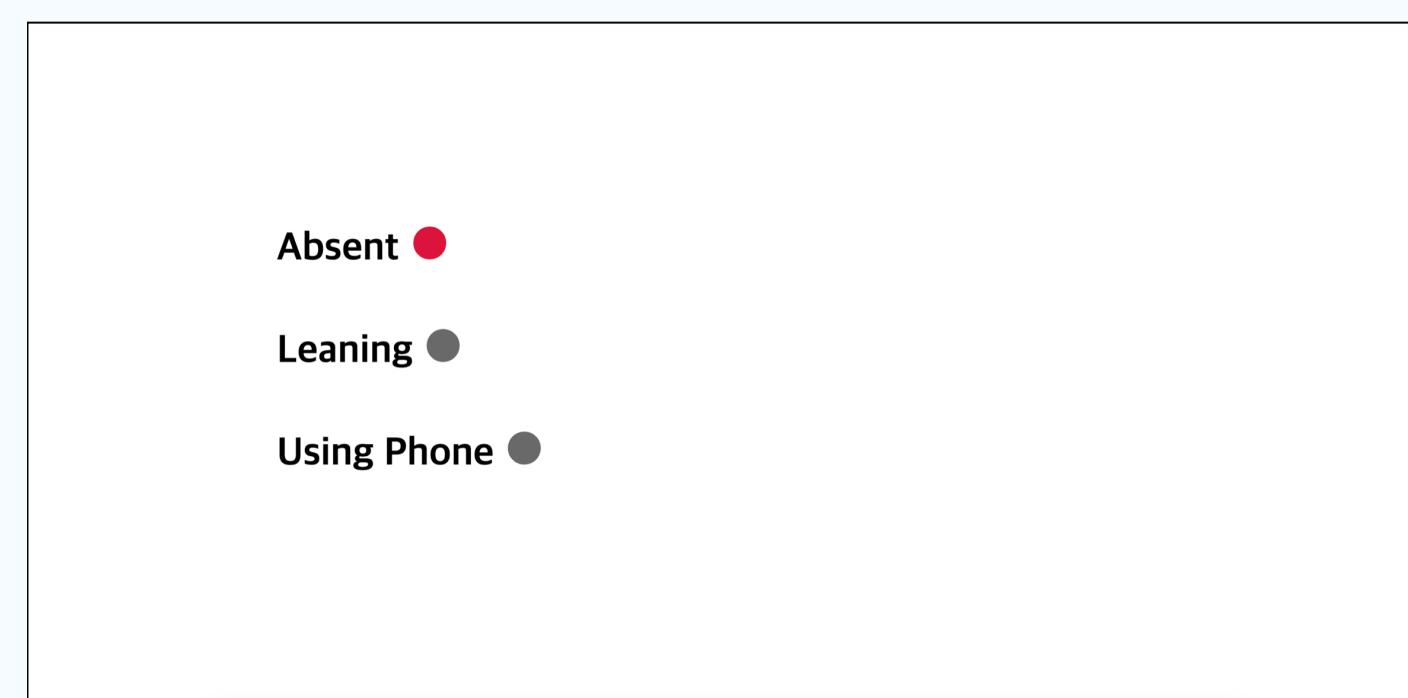
Blurred Video Version



Small Video Version



No Video Version



Step 1.3

Correlating video features with key user needs

Method

Conducted **interviews with 11 virtual co-studying users** about their preferred video features in virtual study rooms and the reasons behind their preferences.

Result

Features for Revealing Needs

- Showing the Front View of the Face
- Showing the Upper Body
- Showing the Study Material

Features for Hiding Needs

- Hiding the Background
- Hiding the Overall Styling
- Not Showing the Full Face
- Not Showing the Full Study Material

Step 2.2

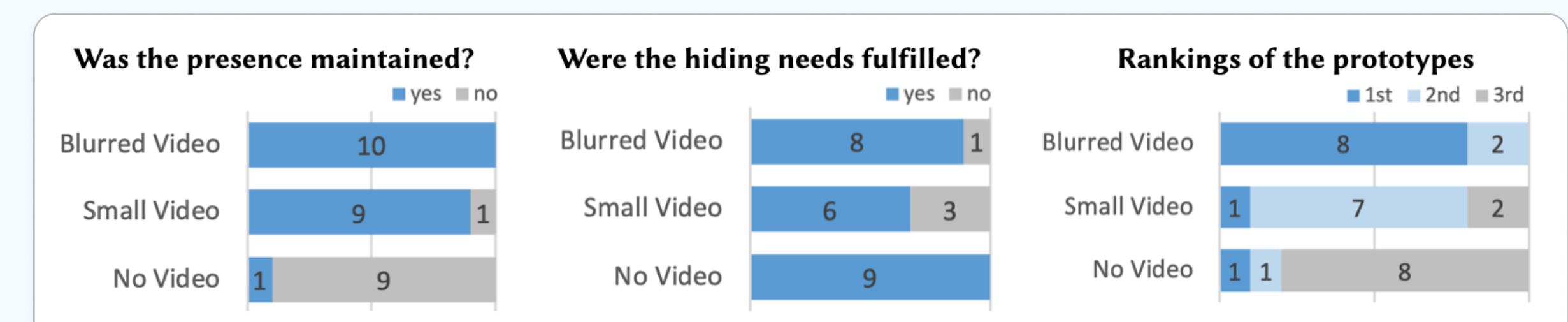
Evaluating the interface prototypes

Method

Four virtual study teams, totaling 10 users, **tested all three prototype versions during a 30-minute study session**. They used each version for 10 minutes, studying as usual, followed by an interview.

Result

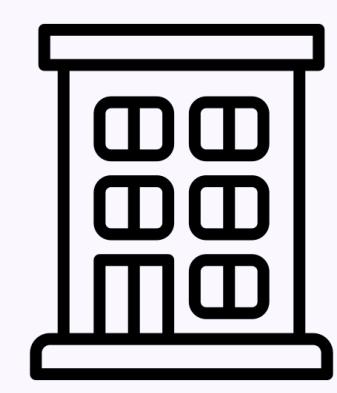
Users valued video presence even with action detection. The blurred video option ranked first for its stronger sense of presence from larger video size, while the 'no video' option ranked third. The **activity recognizer**, initially designed to convey others' presence, was repurposed to enhance **self-presence and self-surveillance**.



* Soobin Cho, Joongseek Lee, and Bongwon Suh. 2023. "I Want to Reveal, but I Also Want to Hide" Understanding the Conflict of Revealing and Hiding Needs in Virtual Study Rooms. Proc. ACM Hum.-Comput. Interact. 7, CSCW2, Article 300 (October 2023), 26 pages. <https://doi.org/10.1145/3610091>

** Soobin Cho, Bongwon Suh, and Joongseek Lee. 2022. "Hide Your Video, Show Your Action!" Investigating a New Video Conferencing Interface for Virtual Studying. In Companion Computer Supported Cooperative Work and Social Computing (CSCW'22 Companion), November 08–22, 2022, Virtual Event, Taiwan. ACM, New York, NY, USA, 5 pages. <https://doi.org/10.1145/3500868.3559451>

Designing a Knowledge-Sharing Chatbot for a Co-Living Space



Co-Living Space

A co-living space **combines private living areas with shared facilities** like dining spaces and gyms, fostering social connections among residents. However, this study was conducted at a co-living space for single-person households of young adults below a certain income level, primarily students or job seekers. As a result, it has a **busy atmosphere with limited focus on social connections**.

Step 1. Identifying communication needs and goals of co-living residents

Step 1.1

Understanding communication patterns and needs

Method

Conducted **interviews** with six **residents** and two **managers**.

Result

Identified two primary needs: 1) **accumulating information** about the space and 2) **fostering light connections among residents**.

Key Points on Information Needs

- Residents faced inconveniences due to insufficient information about shared space rules and facilities.
- Managers received repeated questions about facilities and required an archive for consistent responses.

Key Points on Connection Needs

- Residents had conflicting views on interaction: some desired connection but lacked proper channels or events, while others avoided it, seeing it as a waste of emotional energy.

Step 1.2

Identifying communication goals

Method

Conducted a 3-hour **co-creation workshop** with 15 participants, including residents, managers, and researchers. Each team, consisting of residents, a manager, and a researcher, discussed **issues faced by single-person households due to a lack of connection with others**, identified key challenges, and brainstormed solutions.

Result

Residents identified three connection needs:

- Emotional connection:** To address loneliness and homesickness.
- Information sharing:** For local, co-living space, and independent living tips.
- Physical help:** For seeking help when needed.

We decided to **focus on information-sharing needs while fostering light connections**—allowing residents to feel connected without burdening those who prefer minimal interaction, as shown in interviews.

Step 2. Designing chatbot conversation flows

Step 2.1

Chatbot conversation flow design

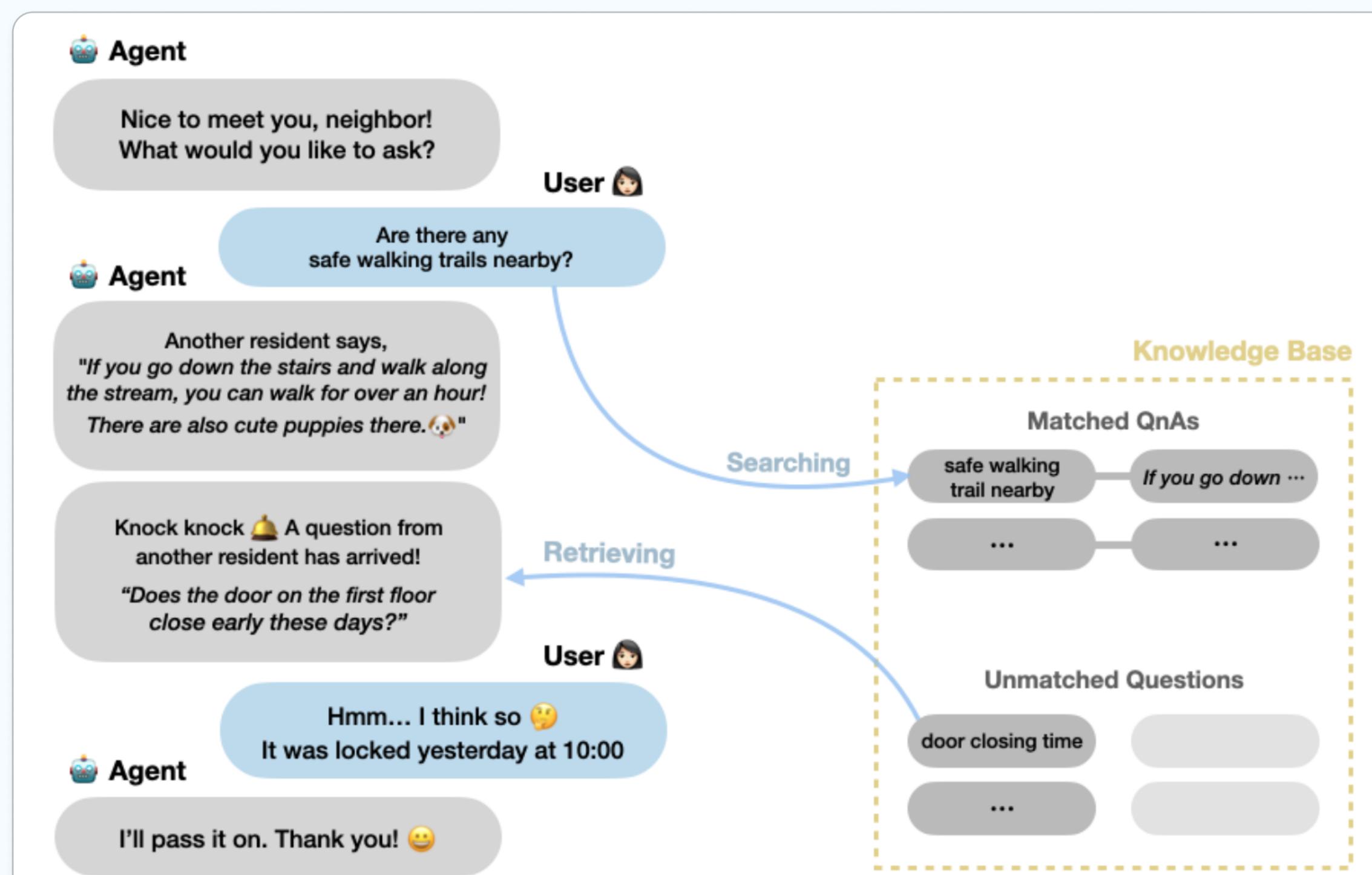
Method

Designed the chatbot based on two principles:

- Encourage residents to **share helpful information**.
- Foster connections by **revealing the presence** of other residents.

Result

The chatbot adopted a "give-and-take Q&A" structure and conveyed other residents' messages **word-for-word**.



Step 2.2

Evaluating chatbot usage and impact on user needs

Method

Conducted a **week-long usability case study** with 19 co-living space residents, followed by semi-structured interviews with six participants about their chatbot experience. The chatbot operated in a Wizard of Oz format via the 'KakaoTalk' messenger.

Result

- Usage patterns:**
 - Response rate: Users **answered 76%** of each other's questions.
 - Topics: Of 48 questions, 39 were about the local area, 8 about shared spaces, and 1 about life hacks.
- Effects:**

Informational Effects

- Resident-only:** Residents appreciated responses from peers in similar situations.
- Experience-based:** Some found these responses more trustworthy than internet searches, which often include ads.

Emotional Effects

- The 'give-and-take' structure created a **sense of presence** through exchanges with other residents.
- Phrases revealing other residents' presence enhanced **interest, comfort, and connection**.

3. Industry UXR Projects

- Expanding the User Base
- Enhancing a Specific User Activity

Expanding the User Base of EVinfra

Korea's leading EV charging station app

Observed stagnant app user growth, so conducted a **6-step research** to expand the user base.

Goal 1. Identifying a new target user group (3-step)

Step 1.

Understanding current market dynamics



Method

Competitive analysis of similar apps (tracking search volume, user growth trends, active device count, new installations, etc.).

Result

Identified that apps like ours show stagnant usage, while **specific-purpose apps are seeing increased activity**. This led to the hypothesis that targeting a **new, specific user group could be beneficial**.

Step 2.

Capturing sentiment trends among potential target users



Method

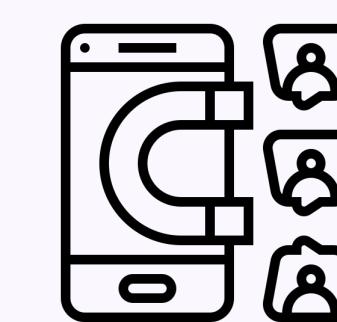
Qualitative analysis of 1,021 posts and comments from **EV online communities**, covering data from 2020 to 2023.

Result

Opinion trends and their evolution over time indicated that the potential **new target audience may not gain significant benefits from our app's main function**.

Step 3.

Validating correlations between sentiment trends and app engagement



Method

App usage and payment behavior analysis of the potential new target user group.

Result

Identified a pattern where **metrics indicating the size of this user group increased, while payments through our service decreased**. Additionally, this group showed **lower engagement and return visits** compared to other user groups. This justified the need to adapt strategies for this audience.

Goal 2. Understanding their charging scenarios and pain points (2-step)

Step 4.

Bulletin board focus group (27 users)



Method specifics

Divided the new target user group into two subgroups, created **group chats** for each, and introduced a daily topic to encourage **open discussion** on related interests over three days. This method was **chosen for its flexibility**, allowing for deeper exploration than a survey while still capturing insights from multiple users. Additionally, since the target group was not yet segmented, this approach enabled us to simultaneously explore different subgroups.

Result

Confirmed which subgroup to target out of the two subgroups and developed interview questions for a deeper understanding.

Step 5.

User interviews (4 users)



Method specifics

Conducted interviews with focus group participants from the target subgroup.

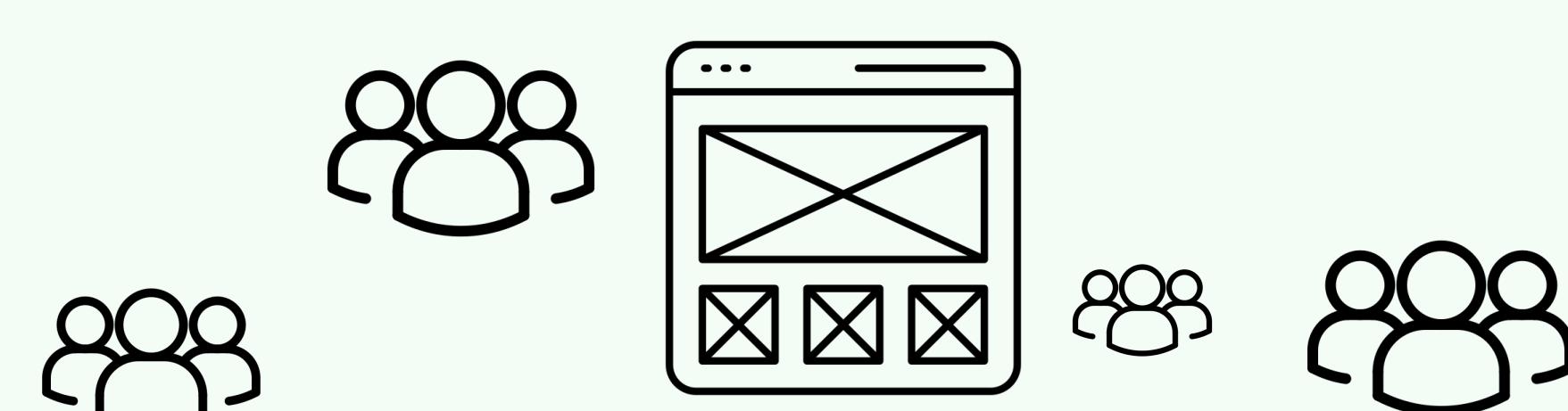
Result

Gained a clear understanding of their charging journey, including where and why they use our app or competitors' apps. Also identified their needs and pain points throughout the journey and decided, together with stakeholders, to **prioritize the most frequently mentioned issue, 'A'**—a situation where users experience conflicts with other users—for future product improvements.

Goal 3. Exploring solutions to address the pain point

Step 6.

Co-creation workshop (25 participants)



Method specifics

Conducted a 3-hour workshop with 15 users and 10 internal stakeholders, including the CEO, COO, UX designers, and engineers. Five teams were formed, each with three users and two company members, totaling five participants per team. The workshop was divided into two main parts. In the first part, teams **brainstormed information they would want to share with or receive from other users regarding issue 'A'**, then prioritized these types of information. In the second part, teams **sketched screens to explore how our app could facilitate user-to-user information interaction**, created wireframes, and shared each team's proposed interaction approach, gathering feedback on preferences.

Result

Broke down the information users want to share with or receive from others in the context of issue 'A' into manageable units. Collaborated with stakeholders to **select which units to display, considering feasibility, development effort, and user-perceived importance**.

Enhancing a Specific User Activity in EVintra

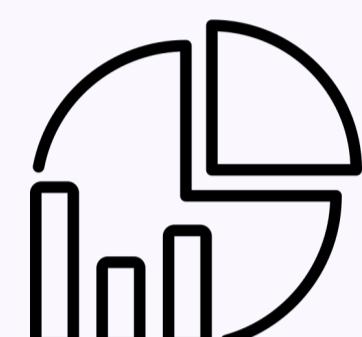
Korea's leading EV charging station app

Recognizing that charging station reviews are core to the app's value, conducted a **5-phase research**.

Goal 1. Identifying key information needs and behavioral drivers (3-phase)

Phase 1.

Assessing the significance of information types



Method

Content analysis of 5,273 reviews from the past six months, including quantitative proportions.

Result

Identified 16 major information categories and 36 subcategories. Information type A appeared in 41% of all reviews, with the top three types comprising 64%. This suggests that **information type A and the top three types are especially valuable** for conveying charging station insights through reviews.

Phase 2.

Additional analysis of new users' information-sharing needs



Method

Additional analysis of reviews from **users who joined within the last 90 days**, including content where users posted questions.

Result

Certain information subcategories were shared more frequently by new users than in the overall review pool, with type A-1 showing the largest difference (3% vs. 13%). This suggests that **new users, possibly first-time EV market entrants, have distinct information needs** and more questions on specific topics.

Phase 3.

Exploring correlations between review volume and charging behavior



Method

Four-year analysis of **app usage and payment behavior** to examine correlations between review volume and metrics like charging volume, number of charging members, and charging frequency, as well as between the number of reviewers and these metrics.

Result

Found no clear correlation, so we decided to abandon the hypothesis that high charging activity leads to more reviews, **shifting our focus instead to understanding why users write reviews**.

Goal 2. Understanding review patterns and reasons for (non-)submission (2-phase)

Phase 4.

Scenario-based survey (103 users)



Method specifics

Developed four charging scenarios by combining key information types from Phase 1. Presented these as **webtoon-style journeys**, then had users write: reviews (as if in real situations), reasons for (non-)submission, intended audience, and timing.

Result

While some information types were less common in Phase 1, they were highly prioritized in specific situations, **underscoring their importance when they arise**. Reviews fell into five main motivational categories (15 subcategories), with 42% aimed at **helping other users**. Non-submissions were grouped into three main categories (10 subcategories), with 51% due to a perceived lack of importance. Reviews generally aimed to aid others, though the intended audience varied by information type. Most reviews were written at three specific points during the charging journey when charging was unavailable and at one main point when charging was available.

Phase 5.

User interviews (5 users)



Method specifics

Conducted interviews with five survey participants: three experienced users and two new users.

Result

Identified **differences in detailed motivations** for writing reviews **between experienced and new users**. Examined reasons for including specific information elements, clarified why users write reviews in our app and **which features encourage it**, and observed how users write reviews in competitor apps.



Developed design principles and guidelines for the review feature.

1. Collaborated with the lead product manager to **clearly define the review feature**, including its purpose.
2. Jointly **identified three key user behaviors** essential for active review participation, aligned with its purpose.
3. Co-developed **core principles to encourage each behavior**, along with detailed guidelines.
4. Worked with designers to **create concrete design examples** for the guidelines.
5. Compiled and shared the principles, guidelines, and examples with all stakeholders involved in the review feature.